

SIGMOID RECONFIGURED VAGINAL CONSTRUCTION IN CHILDREN

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ABSTRACT

Purpose: We present a modified technique of sigmoid neovaginal construction in children that protects the sigmoid pedicle from traction, allows easy adjustment of caliber and reorients the mucosal fold in a longitudinal direction.

Materials and Methods: From 1997 to 2000, 10 genetically male (46 XY) children 1 to 13 years old underwent construction of a neovagina with sigmoid, incorporating the Yang-Monti concept of intestinal reconfiguration. The diagnosis was androgen insensitivity in 7 patients, congenital adrenal hyperplasia in 2 due to 17α -hydroxylase deficiency and 3β -hydroxysteroid dehydrogenase deficiency, respectively, and bladder exstrophy in 1 who required sex reassignment.

Results: Eight children had an adequate caliber neovagina after an initial period of systematic dilation. In 1 case a relevant stricture required reoperation using the same technique and the outcome was good. In another child a stricture developed in the middle of the reconfigured sigmoid segment and a regular dilation schedule is still being followed after 23 months of followup.

Conclusions: The new sigmoid reconfiguration technique enables the use of smaller dimension intestinal segments and construction of a long vaginal conduit of adequate caliber. Its optimal adequacy for penetration must be assessed in the future after these patients begin sexual activity.

KEY WORDS: abnormalities, vagina, sigmoid, urinary diversion

Neovaginal construction in cases of a congenitally absent vagina depends on the degree of development of the müllerian structures. When the uterus is present and the vagina is hypoplastic, progressive intermittent perineal pressure and dilation techniques may achieve adequate results without major surgical intervention.^{1–3} When such müllerian structures are completely absent, as in genetically male patients in whom the genitalia are inadequate for the children to be raised as male, myocutaneous flaps⁴ or skin grafts⁵ can be placed. Nevertheless, the most applied option has been intestinal segments^{6–8} since the mucosal surface renders the organ more suitable for sexual activity, especially when surgery is performed in childhood.⁹ Sigmoid would be more adequate because it would provide a tube of convenient length, proximity to the pelvic structures, thicker walls and less mucous formation. Although the sigmoid has been used often, occasionally the impossibility of obtaining a pedicle long enough to reach the perineum may be a major limiting factor. We report a series of 10 sigmoid vaginoplasties and propose a technical change based on the Yang-Monti concept of intestinal reconfiguration that makes pedicle stretching less likely at pull-through by changing the direction of the mucosal folds, thus, rendering penetration easier during sexual intercourse and adjusting the organ to the required dimensions.^{10,11}

MATERIALS AND METHODS

From 1997 to 2000, 10 genetically male (46 XY) patients 1 to 13 years old underwent vaginal construction with reconfigured sigmoid. The presenting diagnoses were androgen insensitivity in 7 cases, congenital adrenal hyperplasia in 2 due to 17α -hydroxylase and 3β -hydroxysteroid dehydrogenase deficiency, respectively, and bladder exstrophy in 1 with so rudimentary and bifid a phallus that after discussion with the family sex reassignment was elected. Age at diagnosis was 1 day to 4 years. The 2 children with androgen insensi-

tivity and the 1 with congenital adrenal hyperplasia due to 17α -hydroxylase deficiency had consanguineous parents. A reconfigured sigmoid was used to construct a neovagina in all cases.

SURGICAL TECHNIQUE

After mechanical bowel preparation 3 days preoperatively the operation is performed with the patient supine. A Foley catheter is inserted into the bladder. A transverse skin incision is made with the abdomen and pelvic region approached by a vertical incision in the rectal sheath. The sigmoid is held between noncrushing clamps. An adequate pedicle and the capacity to reach the perineum are the criteria used to select the segment to be reconfigured. An approximately 6 cm. sleeve of sigmoid is selected and an opening is made at the mesenteric board after it has been split into another 2 segments (fig. 1).

A running suture is placed to bring together the 2 edges adjacent to the mesenterium, changing the direction of the mucosal direction from transverse to longitudinal (fig. 2). Thus, the vessel pedicle is restricted to the central area of the conduit and tension-free pull-through is done. The butt end of the loop is closed with 1 layer of absorbable suture material and a running suture is then placed to join the free edges of the neovagina (fig. 3).

Before reconfiguration is performed conduit width may or may not be reduced to adjust it to the pelvic cavity and vulval dimensions. The perineal approach allows the introduction of a Penrose drain, of which the end is placed in the retrovesical space to enable passage of a set of Hegar dilators of increasing sizes for creating a large enough space for the neovagina. The reconfigured sigmoid segment is then carried to the perineum after it has been fixed to the retroperitoneum at the promontorium level. This fixation with nonabsorbable suture prevents neovaginal wandering and segment prolapse. No stents are left in the neovagina and the urethral catheter remains in place for 7 days.

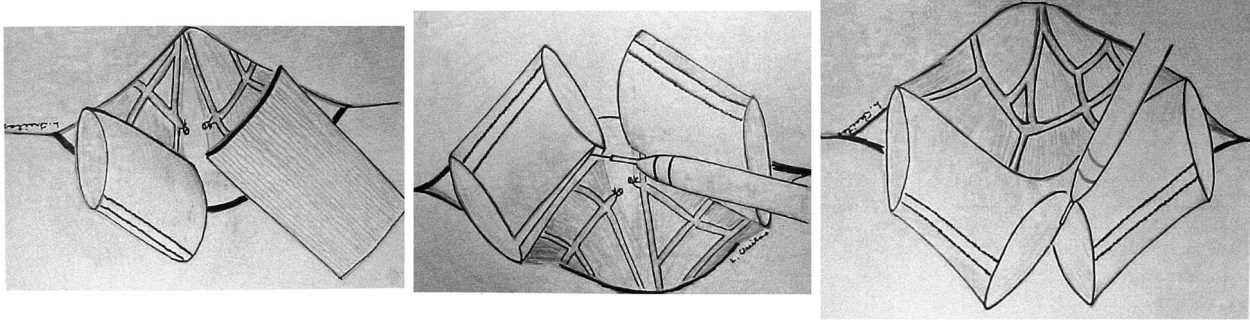


FIG. 1. Isolation and start of sigmoid reconfiguration

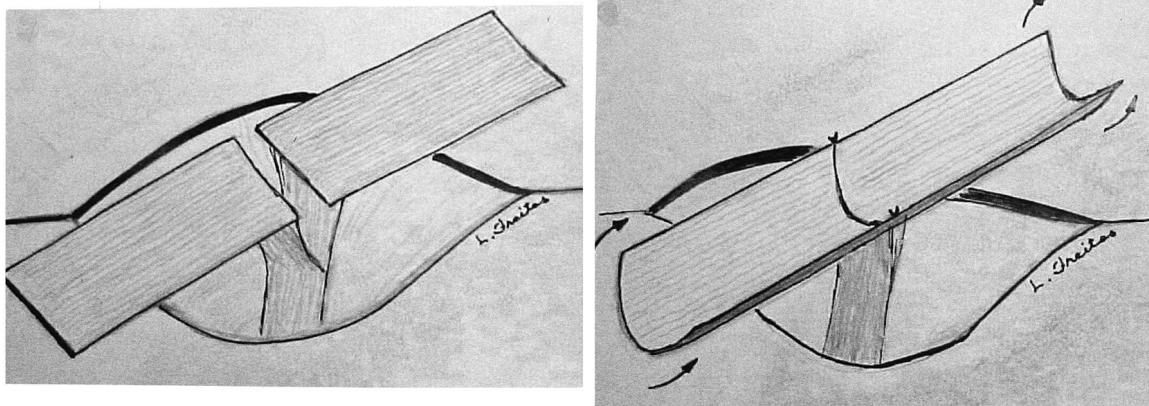


FIG. 2. Changing transverse into longitudinal folds

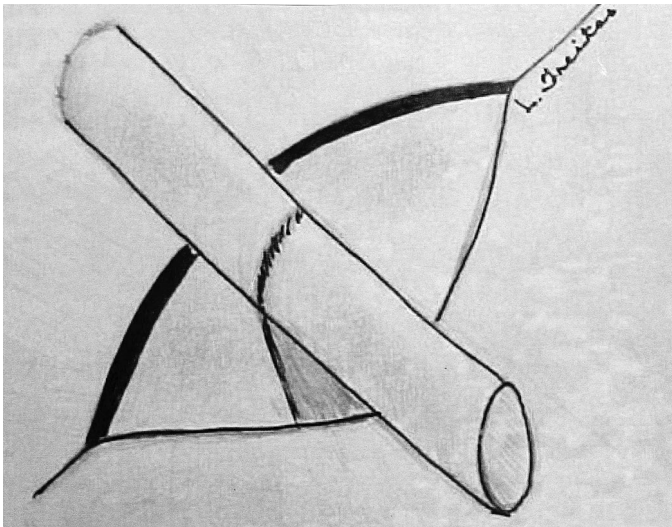


FIG. 3. Neovagina with pedicle limited to abdomen

RESULTS

To evaluate results in all cases physical examination was performed using general anesthesia at the end of postoperative month 1. The length and width of the neovagina were measured and vaginography was performed by injecting iodine contrast material through a Foley catheter with the balloon inflated and placed in the vaginal introitus. All patients underwent vaginal dilation of the sections initially on a weekly basis and beginning at month 3 at various times as required. In 1 case significant stricture at the introitus prevented vaginal dilation. Vaginoplasty was repeated using reconfigured sigmoid with a good outcome. This child is currently well 1½ years after the last surgery. In the patient

with congenital adrenal hyperplasia due to 17α -hydroxylase deficiency a stricture developed in the middle of the neovagina, corresponding to the site of pedicle concentration and anastomosis of the 2 segments. After 23 months of followup the stricture persists despite weekly dilation sessions. Eight children had no postoperative complications. At neovaginoplasty the patient with bladder exstrophy underwent posterior innominate osteotomy, bladder closure and augmentation, and appendicovesicostomy by the Mitrofanoff principle.¹² In all cases an approximately 6-month initial period of mucous formation in the neovagina was treated with daily saline solution enemas and prophylactic doses of sulfamethoxazole/trimethoprim. Followup was between 6 months and 3 years 5 months. To date none of the patients has begun sexual activity.

DISCUSSION

Several techniques have been used for constructing an adequate vagina in phenotypically female but genetically male children. Flaps and skin grafts were placed when the morbidity and mortality of intestinal intervention were high.⁵ However, with improved anesthetic conditions and more adequate infection control intestinal segments were considered more adequate since they can provide a mucosa for penetration during sexual intercourse. Due to irrigation mobility intestinal segments appear to be mobile enough to reach the perineum⁶ if the pedicle undergoes no great traction. Because of its proximity to the pelvic structures, wide caliber and smaller mucous production, the sigmoid has proved to be adequate enough for sexual function and episodes of dyspareunia, which are common when small bowel is used, have not been observed.⁹

The advent of urinary diversion to construct reservoirs for replacing bladder function led to the use of continent conduits after Lapides et al popularized clean intermittent catheterization.^{13,14} The appendix was initially used as an access

conduit to such reservoirs.¹² However, more recently Yang¹⁰ and subsequently Monti et al¹¹ reconfigured small bowel segments, changing the direction of the mucosal folds to facilitate the introduction of urinary catheters and adjust the organ to the size required to fit the conduit. By reconfiguring the bowel using 2 segments one can focus on the pedicle in the middle of the conduit, thus, avoiding the undesired traction that is usually exerted.¹⁴ As in continent conduits, sigmoid segments can be reconfigured for adjustment to sexual function by concentrating the pedicle in the abdominal area, which avoids traction during pull-through. Such a maneuver enables conduit dimensions to be adjusted to the pelvis of the child. Changing the direction of the mucosa. folds facilitates penile penetration into a vagina that is in such cases deprived of the natural action of the lubrication glands.

The good initial outcome in our series shows that the technical change is adequate. We believe that the 2 complications can be attributable to our initial lack of experience. The first child who underwent surgery had a strictured area in the middle of the conduit, which may have been avoided with a slight reduction in sigmoid caliber at the site of the anastomosis of the 2 reconfigured segments. In the other case there was no logical explanation for the loss of the perineal segment of the neovagina. Reoperation revealed that even if initial surgery should fail as a result of using shorter intestinal segments versus traditional techniques, constructing a new vaginal conduit with the remaining sigmoid is possible. Neovaginal caliber and length were considered adequate in all other patients and the cosmetic outcome was good. Our series is still small and followup has been brief.

CONCLUSIONS

We believe that this technical change may become an alternative for sigmoid vaginoplasty. However, only by increasing experience and longer observation, particularly by as-

sessing with due care the future sexual activity of these patients, may one ascertain the actual relevance of our new technique.

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